

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: November 19, 1993
Date Received: November 10, 1993
Project: Storm Sewer, PO #M 31755
Date Samples Extracted: November 10, 1993
Date Extracts Analyzed: November 11, 1993

**RESULTS FROM THE ANALYSIS OF THE SLUDGE SAMPLE
FOR TOTAL PETROLEUM HYDROCARBONS
BY IR (METHOD 418.1)
(MODIFIED TO REPORT RESULTS AS DIESEL)
Results Reported as µg/g (ppm)**

<u>Sample #</u>	<u>Total Petroleum Hydrocarbons</u>
M 31755	24,000
<u>Quality Assurance</u>	
Blank	<20
M 31755 (Duplicate)	20,000
M 31755 (Matrix Spike) % Recovery	ai
M 31755 (Matrix Spike Duplicate) % Recovery	ai
Spike Blank % Recovery	120%
Spike Level	250

^{ai} The amount spiked was insufficient to give meaningful recovery data.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: November 19, 1993
Date Received: November 10, 1993
Project: Storm Sewer, PO #M 31755
Date Samples Extracted: November 16, 1993
Date Extracts Analyzed: November 17, 1993

**RESULTS FROM THE ANALYSIS OF THE SLUDGE SAMPLE
FOR FINGERPRINT CHARACTERIZATION
BY INDUCTIVELY COUPLED PLASMA (ICP)
EMISSION SPECTROSCOPY
Samples Processed Using Method 3050**

Sample #

M 31755

ICP Characterization

The ICP emission spectroscopy trace showed the presence of the following metals at the approximate level indicated.

Aluminum (1,800 ppm)	Nickel (160 ppm)
Antimony (<1 ppm)	Palladium (<1 ppm)
Arsenic (<1 ppm)	Phosphorous (<1 ppm)
Barium (28 ppm)	Platinum (<1 ppm)
Beryllium (<1 ppm)	Potassium (220 ppm)
Boron (<1 ppm)	Rhenium (<1 ppm)
Cadmium 1(ppm)	Selenium (<1 ppm)
Calcium (530 ppm)	Silicon (27 ppm)
Chromium (2,100 ppm)	Silver (30 ppm)
Cobalt (4 ppm)	Sodium (370 ppm)
Copper (1,600 ppm)	Strontium (10 ppm)
Gold (<1 ppm)	Thallium (<1 ppm)
Iron (2,700 ppm)	Tin (<1 ppm)
Lead (32 ppm)	Titanium (16 ppm)
Magnesium (280 ppm)	Uranium (<1 ppm)
Manganese (50 ppm)	Vanadium (<1 ppm)
Mercury (<1 ppm)	Yttrium (<10 ppm)
Molybdenum (24 ppm)	Zinc (48 ppm)
	Zirconium (<1 ppm)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Andrew John Friedman
James E. Bruya, Ph.D.
(206) 285-8282

3008-B 16th Avenue West
Seattle, WA 98119
FAX: (206) 283-5044

DUPLICATE COPY

November 19, 1993

INVOICE # 93ACU1119-1

Alaskan Copper Works
628 South Hanford
Seattle, WA 98134

RE: Project Storm Sewer, PO #M 31755: Results of testing requested by Gerald Thompson, Project Leader and submitted on November 10, 1993.

1 sludge sample analyzed for Total Petroleum Hydrocarbons by Method 418.1 @ \$50 per sample	\$ 50.00
1 sludge sample characterized by ICP Emission Spectroscopy @ \$75 per sample	<u>75.00</u>
Amount Due	\$ 125.00

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November 19, 1993

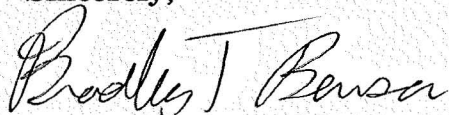
Gerald Thompson, Project Leader
Alaskan Copper Works
628 South Hanford
Seattle, WA 98134

Dear Mr. Thompson:

Enclosed are the results from the testing of material submitted on November 10, 1993 from Project Storm Sewer, PO #M 31755.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,



Bradley T. Benson
Chemist

BTB/dp

Enclosures